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SHORTER ARTICLES AND CORRESPONDENCE

OBSERVATIONS ON THE SPAWNING HABITS OF *HYDROIDES DIANTHUS*

IN connection with experiments and observations on the behavior of several species of annelids, chiefly the one above named, covering a period of several years, it was my good fortune to have seen the apparently somewhat rare phenomenon of the spawning of these annelids under circumstances peculiarly favorable for observation. So far as I am aware this has not been made a matter of record, at least for this species, and some inquiry among students of the group has failed to elicit any detailed knowledge concerning the subject. It seems to be worth while to submit my notes made at the time for at least a record of fact, trusting that they may prove interesting to that extent.

The observations were made upon specimens in an aquarium in my room at the Fisheries laboratory, Woods Hole, on July 30, 1908. A large colony, or aggregate, of these annelids had been freshly obtained from near New Bedford, and had been transferred to my aquarium about two hours before the spawning took place. This was soon after noon of the date mentioned and the first appearance of the discharge took place about two o'clock. I was sitting quietly by the aquarium observing the various aspects and attitudes of the specimens, when a single individual was seen to discharge suddenly a jet of whitish matter, which seemed like a milky spume. It was so unusual as to attract immediate attention, and within a few seconds the same specimen repeated the process. Almost immediately a second specimen made a similar discharge, ejecting a cloudy mass in a jet which extended from twenty to thirty millimeters from the worm, which at the time was extended perhaps about half that distance beyond the orifice of the tube. Almost immediately another specimen exploded in similar fashion, and in less time than it requires to make the record there were dozens actively discharging clouds of eggs and sperms, until the entire mass of water (at least six gallons), was milky with the generative products. The eggs soon settled downward, indeed at the time

of ejection they were easily distinguishable, being ejected to a less distance and rapidly inclining toward the bottom. The spermatozoa, on the other hand, remained floating for an hour or more after the discharge had ceased. The operation went on for a period of some thirty or forty minutes, and then ceased almost as suddenly as it had begun. Within an hour or so the water had cleared of its milky aspect, the cells having settled to the bottom of the tank.

The phenomenon was unlike anything which I had ever seen among annelids. A single specimen would discharge at brief intervals in jets like puffs of steam from an engine, and at the height of the performance, when at least fifty specimens were thus engaged, it was a spectacle of the most striking and exciting character. If one could imagine some Lilliputian fire brigade of similar numbers all intent on discharging intermittent streams upon a miniature conflagration the impression could hardly be more engaging!

Antecedent Behavior.—It had been observed at the time of the transfer of the specimens referred to above, that there were quite a number of large specimens which did not retract fully into the tubes, as is usually the case under such an operation. This aspect was more or less persistent during the operation of handling, and if a specimen were compelled to fully retract by touching it with the finger it would soon reappear and protrude the anterior portion of the body. This protrusion was likely to continue even after they had been put quietly into the aquarium. It was this peculiarity which was engaging my attention at the time the sexual explosions began. The query arose as to whether it might not have been induced by some stimulus associated with the process of transfer and consequent exposure to extraneous conditions. Accordingly I took occasion to subject the colony to similar handling on subsequent days in order to assure myself concerning the matter. But in no case was it possible to induce a second discharge, or any simulation of the sort. It seems highly probable, therefore, that the phenomenon was perfectly normal, notwithstanding its apparently unusual character. During the several years in which I had similar colonies under observation in the same room for long periods it would seem as if *some* symptom of the sort might have been noted. In a letter from Professor J. Percy Moore I am assured that

Although I have kept large numbers of *Hydroides* literally bursting with genital products under observation, I have seen natural oviposition only twice.

Professor A. L. Treadwell has also stated that he has observed a similar operation in the egg-laying of *Dopatra*. He says further:

Whether the epidemic of egg-laying, in which when one starts the others follow, is due to a similar stimulus acting on all of them at once, or whether the first one stimulates the others, is not certain. I should consider the latter the more probable explanation. I found that to be the case in *Podarke*, where, if one started, the whole dish was apt to explode.

So far as could be ascertained under casual observation the individuals participating in the performance were about equally males and females, a further indication of the essentially normal character of the phenomenon. It would seem as if specimens of approximately similar age and condition of maturity ripen the genital products at a given time, and under the appropriate stimulus discharge them simultaneously.

The behavior will recall the somewhat similar exhibition of the pololo worm, whose swarming and coincident spawning has been described by several observers. May we not conclude that these several phenomena are but varying expressions of a spawning habit more or less common in annelids, and indeed not unknown among other of the lower invertebrates, though differing of course in various details?

It may be mentioned in conclusion that the ova discharged by the worms at the time described were promptly fertilized and developed in a perfectly normal and regular fashion.

CHAS. W. HARGITT.

SYRACUSE UNIVERSITY,
January 14, 1910.